

CLAIMS:

1. A device (1) comprising a sensor element (5, 31, 32, 33, 71) having biomolecular binding sites (5a) for a biomolecule (6a), characterised in that the device (1) comprises: a remote power transmission element (3, 101), a resonance circuit, said resonance circuit comprising an resonance frequency determining sensor element (5, 31, 32,) or being electrically coupled to a resonance frequency determining sensor element (33, 71), wherein binding at the binding sites (5a) effects a physical property (R, L, C, mass) of the sensor element (5, 31, 32, 33, 71) and thereby the resonance frequency (f), and a circuit for RF communication of an RF signal (RF) in dependence of the resonance frequency of the resonance circuit.

10

2. A device as claimed in claim 1, characterised in that the remote power transmission element comprises a photodiode (3).

15 3. A device as claimed in claim 1, characterised in that the remote power transmission element comprises a coil (101) for receiving RF power whereby the remote power transmission element is arranged for receiving an RF frequency different from the resonance frequency.

20 4. A device as claimed in claim 1, characterised in that the sensor element (5, 31, 32) forms a part of the resonance frequency circuit.

25 5. A device as claimed in claim 4, characterised in that the sensor element (33, 71) forms part of a voltage or current supplying circuit, coupled to the resonance circuit, wherein the voltage (V) or current (I) of the supplying circuit is dependent on a physical property (R) of the sensor element, and the resonance frequency (f) of the resonance circuit is dependent on said voltage (V) or current (I).

6. A device as claimed in claim 1 or 4, characterised in that the sensor element (71) is a GMR magnetoresistive element.

7. A device as claimed in claim 3 or 4, characterised in that the sensor elements 5 are resistive elements provided in a bridge configuration.

8. A device as claimed in claim 2, characterised in that the sensors elements are located on the surface of an on-chip SAW/BAW (Surface Acoustic Wave/Bulk Acoustic Wave) resonator which is part of the oscillator circuit.

10

9. A method for detecting biomolecules in samples using a device (1) comprising a sensor element (5, 31, 32, 33, 71) having biomolecular binding sites (5a) for a biomolecule, characterised in that a sensor device is used comprising a remote power transmission element (3), a resonance circuit comprising an resonance frequency determining sensor element (5, 31, 32), or being electrically coupled to a resonance frequency determining sensor element (33, 71), wherein binding at the bonding sites effects a physical property of the sensor element (5, 31, 32, 33, 71) and thereby the resonance frequency, and a circuit for RF communication of an RF signal in dependence of the resonance frequency, the method comprising the steps of:

- 20 a) Binding a target to binding sites of the sensor element
- b) Remotely sending power to the remote power transmission element for powering the biosensor device
- c) recording the RF signal emitted by the circuit for RF communication.

25 10. A method as claimed in claim 9, characterised in that the remote power transmission element comprises a photodiode (3) and in step b light (2) is shone on the photodiode.

30 11. A method as claimed in claim 9, characterised in that the remote transmission element comprises a coil (101) for receiving RF power whereby the remote power transmission element is arranged for receiving an RF frequency different from the resonance frequency and in step b an RF frequency corresponding to the RF frequency of the remote power transmission element is emitted.

12. A system for detecting biomolecules in samples provided on a biosensor device, which system comprises the biosensor device and a reader station comprising a power transmitting element for transmitting power to the biosensor device and an antenna and a receiver for receiving of signals to be wirelessly transmitted from the biosensor device to the reader station with a transmitting frequency, characterized in that:

- a device as claimed in any of the Claims 1 to 8 is present,
- the apparatus comprises or is connected to an analyser for analysing the transmitting frequency of the signal of the biosensor device or the change thereof with respect to a calibration frequency.

10

13. A reader station comprising:

- a power transmitting element for transmitting power to a biosensor device;
- an antenna and a receiver for receiving of signals to be wirelessly transmitted from the biosensor device to the reader station with a transmitting frequency, and
- an analyser for analysing the transmitting frequency of the signal of the biosensor device or the change thereof with respect to a calibration frequency.

15